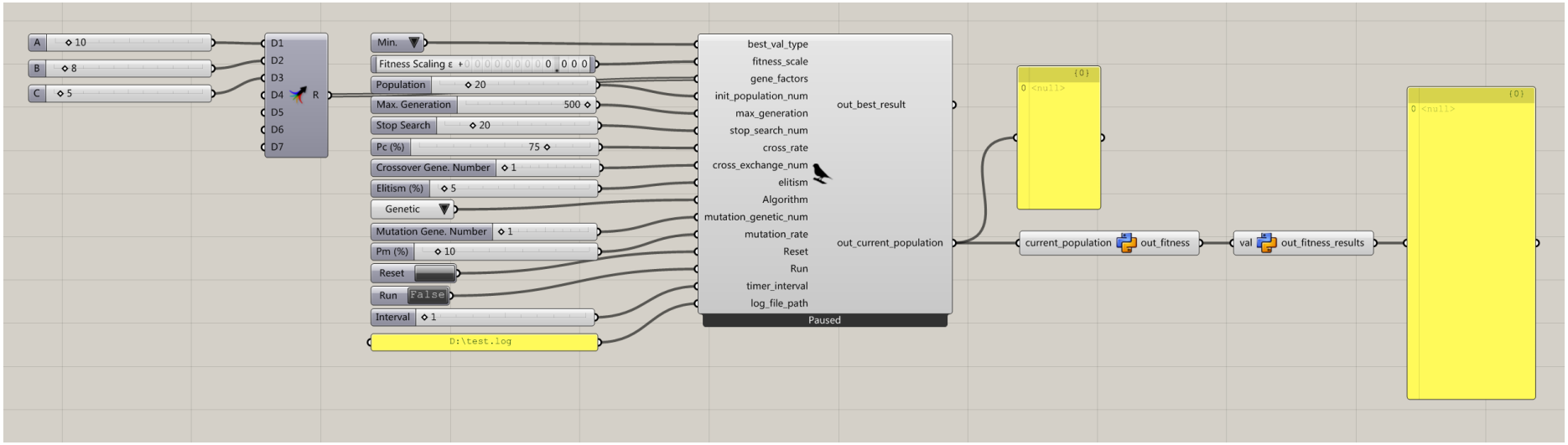

Passerine is an optimization tool mainly focused on solving facade optimization problems (or other passive design strategies). Compared simple GA, it can find the optimal solutions with less optimization time. The name Passerine is for the birds Darwin found in Galapagos.

Features:

1. Fitness function: 'Dynamic nonlinear scaling' is used to coordinate the fitness function for each generation. The users can define the scaling factor Ɛ by themselves.
2. Crossover function:

The users have two selections: 1-point crossover and uniform crossover. 1-point crossover is efficient when the user can separate the thermal-simulation parameter and the lighting-simulation parameters first.

I will also add the third selection - Adaptive Radiation (average crossover) later.

3. Mutation function: I add mutation rate (Pm) input for users.

Min./Max.: To achieve the minimum or maximum optimization value.

Fitness scale (ε): 'Dynamic nonlinear scaling' is implemented to coordinate the fitness function for each generation. The 'scaling factor' ε should be different in different problems. Default value is 0.

Max. Generation: Stop optimization process after N generations.

Stop Search: Stop optimization process if the optimization value hasn't been improved after N generations.

Pc (%): The crossover ratio.

Crossover Gene. Number: Uniform Crossover is implemented in this Genetic Algorithm. In building optimization problems, each gene reflects one design parameter (WWR, insulation type, glazing type, etc.). Therefore Uniform Crossover is more appropriate for building optimization problems when compared with other crossover mechanisms.

*The value should **be smaller than** the number of the total design parameters.

**1-Point Crossover is widely used in many Genetic Algorithms, which sometimes is actually not appropriate in building optimization. 1-point crossover will be efficient when the user can separate the thermal-simulation parameter and the lighting-simulation parameters first.

Elitism (%): When Elitism is larger than 0%, 'elitist selection' is implemented in this Genetic Algorithm, which means N% children are passed directly to the new generations without crossover or mutation mechanism. This is to make sure that the gene of 'good children' can be kept. Default value is 5(%).

Genetic/Brute Force: Select between Genetic Algorithm and Brute Force algorithms.

Mutation Gene. Number:

Pm (%): The mutation ratio.

Reset: Click to reset the optimization results.

Run: Set to True to start the optimization process.

Interval: Time interval for optimization. Default value is 1.

log_file_path: Set a file path to save the optimization results and process.